REMARKS

Claims 1 and 10-29 are pending in the present application. Claims 1 and 10-20 stand rejected under 35 USC 102(b) as being anticipated by Alexoff (4,616,500). Claims 21 and 22 stand rejected under 35 USC 103(a) as being unpatentable over Alexoff in view of Kaneko (6,7598,077). Claims 23-29 stand rejected under 35 USC 103(a) as being unpatentable over Alexoff in view of Stump (4,161,112). The Applicant traverses these rejections and seeks reconsideration in light of the aforementioned amendments and the following arguments.

102(b) Rejections

The applicant seeks reconsideration in light of the attached amendments. The inventive method for manufacturing hollow shafts according to claim 1 has been further limited by the features according to which there are provided at least two intermediate portions of the hollow shaft, which are produced by the mandrel which has at least three longitudinal sections for producing said hollow shaft. This method according to new claim 1 is shown in figures 2 and 3 and described in paragraphs [0018] and [0035] of the originally filed patent application.

The finished hollow shaft (11') of the embodiment according to figure 2 is shown in figure 2H, in which the two shaft ends (12', 16') and three intermediate portions (13', 14' and 15') can be seen, having two different diameters. Figure 3H shows the finished shaft of a further embodiment, wherein it can be seen that the hollow shaft has two shaft ends (12', 16') and four intermediate portions (13', 14', 15' and 14_2') of two different diameters.

In accordance with the present limitation, the last mentioned feature of claim 1 referring to the production of the second end portion has been amended so as to read "reducing the external diameter of a further portion of the tube over the first, the second or another longitudinal section of the mandrel to produce the second end portion". The original wording "over another longitudinal section" was not intended to mean that the second end portion of the hollow shaft is produced by using another longitudinal section

than the at least one further longitudinal section (i.e. the third longitudinal section according to new claim 1.)

The inventive method according to new claim 1 has the advantage that all longitudinal portions of the tube can be reduced over a single mandrel, wherein the orientation of the direction of the tube and the mandrel to one another remain the same during the manufacturing process. Yet another advantage is that the hollow shaft has thickened end portions (12', 16'), which can be subjected to higher loads, i.e. for example for introducing torque into the hollow shaft, furthermore, a first intermediate portion (13', 15'), which is subjected to the less loads, and a third intermediate portion (14') having the smallest wall thickness, which is subjected to the least loads. In this way, the hollow shaft can overall be dimensioned specifically in accordance with the technical demands occurring during operation of the hollow shaft. Thus, the overall weight is reduced of the hollow shaft, which is advantageous with regard to the fuel consumption of the vehicle equipped with the inventive hollow shaft.

Alexoff (US '500) discloses a method for producing tubing of variable wall thicknesses, more particularly for producing double-butted tubing, wherein the wall thickness at the ends of the tube is greater than that in the intermediate portion of the tube. Thereby it is produced a tube (26) having first and second end portions, having a greater wall thickness and exactly one intermediate portion, having a reduced wall thickness.

The present invention differs from Alexoff in that the mandrel (at least) includes a first longitudinal section having a first diameter, and a second longitudinal section having a second diameter, and a third longitudinal section having a third diameter, wherein the first diameter is smaller than the second diameter, and wherein the second diameter is smaller than the third diameter. Thus, the inventive method further distinguishes over Alexoff in that it is produced a hollow shaft having a first and second end portions (12', 16') of greater wall thickness and at least one intermediate portion (13', 15') having a smaller wall thickness, and furthermore, at least one second intermediate portion (14') having a yet further reduced wall thickness. The advantage of the tube being produced in the claimed manner having at least three stepped portions is that it can be designed in accordance with the requirements with regard to torque

transmitting capacity and strength. Thus, the hollow shaft being produced with the inventive method has an overall reduced weight. The Applicant therefore traverses the 102(b) rejection and seeks reconsideration in light of the attached amendment.

103(a) Rejections

The Applicant respectfully traverses these rejections in light of the aforementioned amendments and arguments establishing the novelty of the present invention over Alexoff. In addition, Kaneko (US '077) does not go any further with regard to the disclosure of the method of manufacturing a hollow shaft. As can be seen in Figure 8, the piping material (1) has exactly one middle section (1F) having a smaller diameter than the end sections. The method according to Kaneko includes the step of rotating the piping material (1) and the cored bar (2) and displacing the piping material (1) in an axial direction while passively rotating two rollers (3), thereby compressing the outer periphery of the piping material (1), and applying a spinning operation to the piping material (1) while pressuring and retaining the piping material between the court bar (2) and the rollers (3). This is disclosed in figure 3 of Kaneko.

Thus, Kaneko fails to disclose the following features of claim 1: providing a mandrel, having a first longitudinal section with a first diameter, a second longitudinal section with a second diameter and a third longitudinal section with a third diameter, wherein the first diameter is smaller than the second diameter and the second diameter is smaller than the third diameter. Therefore, Kaneko also fails to disclose the hollow shaft which is produced in accordance with the invention, said hollow shaft having two end portions with a greater diameter and at least two intermediate portions with stepped smaller diameters. Kaneko cannot, therefore, be combined with Alexoff to render the present invention obvious. Reconsideration is therefore requested.

Finally, the Applicant traverses the 103(a) rejection of claims 23-29 over Alexoff in view of Stump. Stump (US '112) does not add anything to the disclosure of Alexoff or Kaneko, i.e. Stump also fails to disclose the above-mentioned features.

Therefore, the Applicant asserts that the combination of Alexoff and Kaneko, or Alexoff and Stump would fail to lead the skilled person to the claimed invention. The cited references fail to disclose novel claimed features relating to the hollow shaft

having at least three portions with different wall thicknesses. Reconsideration is requested.

Conclusion

The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 433-7221 if any unresolved matters remain. The Commissioner is also authorized to charge any additional fees or credit any overpayment to Deposit Account No. 04-1061, in the name of Dickinson Wright PLLC.

Respectfully submitted,

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